

What is claimed is:

1 1. A real-time stereo image matching system comprising:
2 a signal converting means for converting an image input from a first camera
3 and a second camera into a digital signal; and
4 an image matching means for calculating a determined matching cost based
5 on a pair of pixels in one scan line of the first and second digital image signals,
6 tracing the decided value which determines the minimum matching cost, and
7 outputting the decided value as an estimated disparity according to predetermined
8 activation information.

1 2. The real-time stereo image matching system of claim 1, wherein the
2 image input to the signal converting means is obtained by the first camera and
3 second camera that have optical axes parallel to each other and have the focal
4 planes on the same plane.

1 3. The real-time stereo image matching system of claim 1, wherein in the
2 image matching means, the calculation of the matching cost is calculated after
3 occlusion information in which pixels do not match in the scan line is added to the
4 first pixel and the second pixel.

1 4. The real-time stereo image matching system of claim 1, wherein the
2 image matching means further comprises:
3 a first storage means for storing the digital image pixels from the first camera;
4 a second storage means for storing the digital image pixels from the second
5 camera;
6 a processing means for outputting a predetermined estimated disparity using
7 pixels input from the first storage means and second storage means; and
8 a clock control means for providing a clock signal for controlling the
9 operations of the first and second storage means and the processing means.

1 5. The real-time stereo image matching system of claim 4, wherein the
2 system is formed of N processing means, N/2 first storage means, and N/2 second
3 storage means (Here, N is a multiple of 2).

1 6. The real-time stereo image matching system of claim 5, wherein the
2 processing means exchanges information with neighboring processing means.

1 7. The real-time stereo image matching system of claim 5, wherein
2 among the N processing means, only the processing means that outputs a
3 predetermined disparity is activated and the remaining processing means are in
4 high impedance states.

1 8. The real-time stereo image matching system of claim 4, wherein
2 the first storage means and the second storage means are initialized when the
3 processing means completes processing of pixels in one scan line.

1 9. The real-time stereo image matching system of claim 4, wherein a
2 pixel stored in the first storage means is delayed by (N/2-1) clock cycles compared
3 to a pixel stored in the second storage means.

1 10. The real-time stereo image matching system of claim 4, wherein the
2 clock control means outputs a first clock signal for the even-numbered processors
3 and the second storage means, and a second clock signal for the odd-numbered
4 processors and the first storage means.

1 11. The real-time stereo image matching system of claim 4, wherein the
2 processing means comprises:

3 a forward processor for receiving a pixel of one scan line in the first storage
4 means and the second storage means, and outputting a determined matching cost
5 and a decision value;

6 a decision storage means for storing the decision value output from the
7 forward processor; and

8 a second processor for outputting a determined disparity, using the decision
9 value output from the decision storage means according to the determined
10 activation information.

1 12. The real-time stereo image matching system of claim 11, wherein
2 when a write control signal is input from outside, the first processor operates, and
3 when a read control signal is input from outside, the second processor operates.

1 13. The real-time stereo image matching system of claim 11, wherein the
2 decision storage means has a last-in first-out structure in which the decided value
3 that is output last from the first processor is first input to the second processor.

1 14. The real-time stereo image matching system of claim 11, wherein the
2 first processor comprises:

3 a matching cost calculating means for calculating a matching cost, using a
4 pixel of one line in the first storage means and the second storage means;

5 a first adding means for adding the calculated matching cost to the fed-back
6 accumulated cost;

7 a comparing means for comparing the output of the first adding means with
8 the costs of neighboring processing means, and then outputting the minimum cost
9 and decision value;

10 a storage means for storing the minimum cost that is the result of the
11 comparison, as the accumulated cost; and

12 a second adding means for adding the entire cost and occlusion cost, and
13 then outputting the result to neighboring processing means.

1 15. The real-time stereo image matching system of claim 11, wherein the
2 second processor comprises:

3 a logical OR means for performing OR-ing the activation information of the
4 neighboring processing means and the feed-back activation information route;

5 a register for storing the last activation information and that is the result of the
6 OR-ing;

7 a demultiplexing means for demultiplexing the last activation information
8 according to the decision value output from the decision storage means to output to
9 the neighboring processing means and feed back to the logical OR means; and
10 a tri-state buffer for outputting the decision value output from the decision
11 storage means, as a determined disparity, according to the activation information of
12 the register.

1 16. The real-time stereo image matching system of claim 17, wherein the
2 output from the decision storage means controls which direction the demultiplexing
3 means passes the activation information.